Missouri Department of Natural Resources
"Integrity and excellence in all we do"

Cryptosporidium and Drinking Water

Water Protection Program fact sheet 4/2004

What is cryptosporidium?

Cryptosporidium parvum (crypto) is a single-celled disease-causing microbe. In the environment, crypto exists as a hard-shelled, egg-like structure called an oocyst. The oocyst is the infectious stage of crypto. Oocysts are extremely small, measuring about four to six microns in diameter; 2,000 oocysts can fit on the head of a pin. Crypto is an intestinal parasite that can cause the illness "cryptosporidiosis."

How do humans become infected with cryptosporidiosis?

Crypto is transmitted by ingestion of oocysts. The oocysts are excreted in the feces of infected humans or animals. Once ingested, the oocyst splits open, releasing sporozoites. These sporozoites invade the lining of the gastrointestinal tract. Crypto may be spread by oocyst-laden, fecally-contaminated hands, surfaces, food and water. Typical exposures include person-to-person, such as handling diapers from an infected child or unsanitary sex practices; animal-to-person, such as fecal contamination from an infected pet or livestock; and environmental, such as unwashed hands or contaminated food or water.

What are the symptoms of crypto?

One to 12 days after infection by the parasite, symptoms may appear. Although some people may not have symptoms, others may have watery diarrhea, headaches, abdominal cramps, nausea, vomiting and low-grade fever. Most people suffer only mild, short-term symptoms lasting one to two weeks, at which time the immune system is able to stop the infection. In people with suppressed immune systems, such as the elderly, people undergoing chemotherapy, who have AIDS or who have recently had an organ or bone marrow transplant, the infection may continue and become life threatening.

Why the concern about crypto in drinking water?

Since 1984, crypto has been linked to several well-documented waterborne outbreaks, including an outbreak in Milwaukee, Wisconsin, which affected 400,000 people. In the oocyst stage, crypto is extremely resistant to disinfection. Current disinfection levels have virtually no effect on the oocyst. Preventing crypto from getting into a water supply in the first place and filtering it out once it does are currently the only effective barriers to preventing contamination and disease outbreaks.

How can crypto get into drinking water supplies?

Oocysts are excreted in the feces of an infected animal or person. The oocysts get into the source waters through sewage or rainwater runoff. As a result, these oocysts can be present in surface waters such as lakes and rivers that are used as drinking water sources.

PUB002012

Can crypto get into well water?

Not likely. Well water is usually protected from crypto and other surface influences by the natural filtering process of the earth; proper well construction adds further protection.

Is my water being treated for crypto?

Because microbes, including crypto, are common in surface waters, the Missouri Department of Natural Resources requires public water systems to treat surface water to remove and inactivate microbes. The stringent water treatment processes required of surface water plants in Missouri include coagulation, floculation, sedimentation, filtration and disinfection. These treatment processes cause the particles in the water to be attracted to each other to make bigger particles, which then settle out. After filtration, the water is disinfected. More than 97 percent of oocysts are removed with proper coagulation and filtration. Public water providers who use surface water as their source need multiple barriers to reduce the risk of crypto contamination. Since crypto is resistant to traditional disinfection, the best protective practices include protecting the watershed from contamination and optimizing water treatment processes.

Does my water system test for crypto?

In the past, public water systems were not required to test for crypto. However, many surface water systems have taken the initiative to monitor on their own. Contact your local public water system for more information.

What does this mean to me?

Crypto at one time or another can be found in nearly all surface waters. As water systems monitor for crypto, the likelihood exists that it will be detected occasionally at low levels in treated water derived from surface water sources. Unless there are other criteria involved, such as high turbidity levels, high particle numbers which can indicate the possible passage of microbes through the water treatment processes, other treatment plant deficiencies or evidence of an outbreak, the finding of occasional oocysts in the finished water should not cause undo alarm. There are some significant concerns with interpreting the results using the current crypto test. Some of the problems are: the oocyst detected may be dead and not able to cause disease; it may not be the species Crypto parvum, which can cause disease in man - approximately 20 species have been identified; recovery rates are low; and it may take up to two weeks to get test results.

What does the future hold for crypto?

Many scientists, health professionals and water treatment specialists are working on better detection tools, health-risk analyses and treatment techniques. The U.S. Environmental Protection Agency (EPA) has included crypto on its priority list of contaminants for possible regulation. Beginning in February 1997, surface water supplies serving a population of more than 100,000 will begin monitoring for crypto and other microbes as part of the Information Collection Rule. The purpose of the rule will be to learn more about microbial health risks and how effective current treatment techniques are at removing and inactivating microbes. The rule will also evaluate current regulations to determine if they are effective in protecting our drinking water supplies from disease-causing microbes and, if not, to provide sound scientific data on which to base future rules.

Where can I get more information?

To learn more about crypto, contact the Missouri Department of Natural Resources at 1-800-361-4827 or (573) 751-1300, the Missouri Department of Health at 1-800-392-0272, the EPA Safe Drinking Water Hotline at 1-800-426-4791 or the Centers for Disease Control's crypto information hotline at 1-404-330-1242.

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-1300 office
(573) 526-1146 fax
www.dnr.mo.gov/wpscd/wpcp